PERFORMANCE OF CASHEW PROCESSING INDUSTRIES: A STUDY IN TANZANIA

Final Synopsis of the Thesis to be submitted to Mangalore University for the award of the degree

Doctor of Philosophy

In

ECONOMICS

(Faculty of Arts)

By

ALFRED NKUBITO NGENDAHAYO

Research Scholar

(Ref: MU/EXB/Ph.D./CR130/Eco./2020-21/E.13, Dated: 03/03/2021)

Department of Post-Graduate Studies and Research in Economics

Mangalore University, Mangalagangothri - 574199

Research Supervisor

DR. JAYAVANTHA NAYAK M.A., PhD.

Professor

Department of Economics

University College, Mangalore – 574 001

2024

- ❖ Introduction
- ❖ Review of Literature
- ❖ Research Gap
- ❖ Statement of Research Problem
- ❖ Objectives of the Research
- ❖ Hypothesis
- ❖ Research Methodology
- ❖ Scope and Limitation
- ❖ Chapter Design
- ❖ Major Findings
- ❖ Implications of the results
- ❖ Direction for Future Research
- ❖ Conclusion
- ❖ References

INTRODUCTION

Industrialization is widely recognized as a vital component in the rapid development of a country, particularly since the era of the Industrial Revolution. Countries that heavily rely on agriculture alone have often lagged in progress, whereas those with flourishing industries have achieved significant development rates. The consensus suggests that rapid industrialization is the key to addressing pressing economic issues such as poverty, unemployment, and malnutrition. When dealing with a predominantly rural economy where agriculture serves as the primary source of income, the focus of industrialization should be on rural areas, explicitly emphasizing the integration of agriculture and industry. In this regard, rural industrialization entails the establishment of agro-processing industries that efficiently utilize local agricultural resources.

Tanzania is emerging as a prime location for cashew processing. Several factors make the country an attractive location for cashew processing; some include a vast supply of raw cashew nuts, growing demand for cashew kernels, the potential for partnerships and collaboration, increased income generation and employment and prospective for government support.

Cashew nuts are cultivated across various regions in the United Republic of Tanzania, with small-scale farmers serving as the primary producers of raw cashews. Annually, Tanzania produces between 200,000 and 300,000 tons of cashews. Cashew production has significantly increased, from 130,334 tons in 2013-14 to 313,826 tons in 2017-18, marking the highest output in the past 15 years. (Cashewnut Board of Tanzania, 2021). In 2017-18, the southern regions (Mtwara, Lindi, and Ruvuma) contributed approximately 90% of the total production (Cashewnut Board of Tanzania, 2019).

Cashew Processing Industry in Tanzania

Cashew processing in Tanzania dates back to the 1960s when it was initiated by a private establishment in Dar es Salaam that started a processing unit. It gained significant momentum in the 1970s when the nation achieved 145,000 Mt in raw cashew nut production. The government owned, managed, and operated them as profit-making parastatals firms. The World Bank funded twelve large-scale cashew processing plants with a total capacity of approximately 85,000 Mt, established between 1968 and the late 1970s (Cashewnut Board of Tanzania, 2017). The Cashewnut Authority of Tanzania (CATA) operated, managed, and

owned the factories. Every factory was a large-scale mechanized unit that used Japanese or Italian technology. After a while, the industries faced operational shortcomings, and the government of Tanzania decided to divest the ownership of the factories to private companies. However, these privatized industries could not operate at their optimum capacities, constrained by limited capacity, skills, and competition for securing materials and markets, and have since been shut down. (Mgonja & Shausi, 2022) . Following that period, there was a decline in cashew production for several reasons, leading to an insufficient supply to meet the production capacities of the factories.

The Tanzania cashew industry is a vibrant and essential component of the nation's agricultural economy, involving various organizations, institutions, and stakeholders. Key players include governmental bodies, processing companies, farmers' cooperatives, financial and research institutions, and international trade partners. Their collective efforts are aimed at driving innovation, quality improvement, and market expansion, fostering sustainable growth and enhancing Tanzania's position in the global cashew industry.

The cashew processing industries play an essential role within Tanzania's food processing sector, providing a significant source of income for many individuals. The processing capacity of cashews is lesser compared to cashew production in Tanzania.

The current operational capacity is around 60,000 Mts, while the average cashew nut production is over 200,000, signifying that the current maximum capacity is only 30 per cent. The industries produce by-products such as cashew shells and testa. There is no established practice of collecting cashew apples for further processing, and commercial extraction of cashew nut shell liquid (CNSL) is minimal, with only one company launching large-scale CNSL extraction in 2020 (Cashewnut Board of Tanzania, 2022). Small and micro-processing industries often use cashew shells as fuel. This indicates a significant underutilization of potential by-products, highlighting insufficient value addition from raw cashews. It also shows that Tanzania is losing much foreign income due to lesser agro-processing practices in the cashew industry than other countries. Recently, the government has convinced traders and companies to build more processing plants to benefit from the demand for cashew kernels worldwide.

Exports represent a crucial economic factor essential for fostering the economic advancement of any nation. These exports include products, services, and capital assets generated domestically and traded with foreign countries.

Raw cashew nuts (RCN) are among Tanzania's top export commodities, playing a crucial role in the agricultural sector and contributing to foreign exchange earnings. RCN exports realized around 520.4 Billion Tanzanian shillings in 2022 and ranked first in cash crop exports (Tanzania National Bureau of Statistics, 2022). The country's RCN production is on the rise, and the failure to prioritize RCN processing within the country means that the country is missing out on the unrealized potential gains that come from cashew value addition. With the increase in Tanzania's raw cashew nuts production, the global cashew kernel demand, and the need to foster sustainable growth in the nation's export of kernels, it is imperative to understand the anticipated performance of the industry in the coming years.

After tobacco, cashew was the second-best significant performer in Tanzania's agricultural exports (Bank of Tanzania, 2018). The country exported 170,000 tons of cashew nuts in 2015, valued at US$ 250.80 million. The rise in prices and sound government policies, such as the implementation of the warehouse receipt system, have attracted more cashew producers and significantly increased the area of total cultivation. In 2017, cashew export value recorded the highest amount at 1,200.5 Tanzanian billion (USD 522 Million approximately). This value was larger than the total combined values of tobacco, coffee, cotton, sisal, cloves, and tea at Tshs 1,085.1 billion (USD 472 Million approximately) (Tanzania National Bureau of Statistics, 2020).

About 90% of cashew produced is exported while unprocessed and is one of Tanzania's core agricultural exports after cotton and coffee, demonstrating an average of 10% of the total agricultural exports. Tanzania exports its cashews to Vietnam, India, the United Kingdom, the USA, Germany, the Netherlands, and other countries (Rabany et al., 2015).

The increase in cashew processing in Tanzania is highly required to benefit from cashew kernels' global demand. Over the years, the country has increased its production and exports, but it could gain more foreign income from exporting processed cashew kernels. Processing is a vital function in the modern marketing of agricultural products. It was insignificant for many years, whereas agricultural yield trading was raw, and customers undertook processing activity by themselves. Processing transforms the raw cashew nuts into kernels for consumption, thus adding value to them and attaining the by-products at the end. Developing value-added activities will escalate firms' and market channel efficiency and reduce wastage and costs. Realizing such advantages necessitates flexibility and agility in setting up production, processing, storing, and distributing the product.

Some limitations to local processing have been recognized and are connected with undependable energy, water, and high startup costs. Cashew nut processing requires enormous capital investment, demanding purchasing and installing expensive machinery. For instance, a small-scale manual processing plant with a 48 tonnes capacity per year demands an investment of approximately TZS 1 billion (Akyoo & Mpenda, 2014)

Tanzania has huge potential to add more value to its cashews by processing, seasoning, packaging, and exporting them. It requires industries to work at their optimum/maximum capacities together with the proper utilization of cashew by-products and cashew apples.

Increasing the country's cashew processing capacity is crucial for its economic growth and development. The importance of enhancing cashew processing capacity in Tanzania is:

1. By processing cashews locally, countries can add value to their raw cashew nuts, thereby increasing their export revenue, which can lead to higher national output and can become an engine of growth, boosting the economy.
2. It will allow Tanzania to access international markets for its processed cashew products, stimulating economic growth and leading to higher output and increased domestic consumption.
3. Increased cashew processing capacity creates linkages that stimulate the development of related industries, promoting diversification and reducing economic dependence on raw exports.
4. Enhanced processing capacity leads to more efficient use of the country's resources. In Tanzania's cashew industry, there can be a rise in the real incomes of farmers, workers, and cashew processors.
5. Developing the cashew processing sector can attract foreign investment, helping to exploit the country's comparative advantage in cashew production. This can also spur investment in other sectors of the economy.
6. The growth of the cashew processing sector encourages the development of local entrepreneurs and skilled labour, fostering innovation and economic resilience.

Enhancing cashew processing capacity in Tanzania is crucial for economic growth, job creation, and increased export revenues. It allows for greater value addition within the country, boosting GDP and reducing reliance on raw nut exports. Expanding the processing industry

creates employment opportunities, particularly in rural areas, alleviating poverty and improving living standards. It also fosters technological advancement and innovation in agriculture, enhancing productivity and efficiency. Local processing ensures better quality control, making Tanzanian cashew products more competitive in global markets, and allows for market diversification through various cashew-based products. Additionally, it promotes sustainable development by reducing the environmental impact associated with exporting raw nuts for processing elsewhere.

REVIEW OF LITERATURE

The review of literature is essential in systematic research as it familiarizes researchers with existing methodologies, updates the knowledge base in their field, and identifies gaps in the current research. It aids in formulating research questions, setting objectives, and selecting appropriate methodologies for efficient research. Additionally, it enables researchers to compare previous study results, facilitating critical debate and rationalization of conclusions.

This chapter provides an investigative review of several researchers' works in similar study areas, focusing on cashew processing, packaging, grading, and exportation. It discusses relevant studies and reports on the cashew industry from national and international journals and other platforms, contributing to the knowledge base of cashew research. It is presented under the following headings:

1. Studies related to the cashew value chain
2. Studies associated with the constraints in the processing industries.

Studies related to the overall value chain

There are numerous studies that delve into various aspects of agricultural production, processing, marketing, exports, growth and instability, as well as the economic viability and profitability of agro-processing. These studies encompass a wide range of topics, including the efficiency of agricultural production methods, the effectiveness of different processing techniques, and the dynamics of marketing agricultural products both domestically and internationally. Additionally, research has been conducted on the trends and patterns in agricultural exports to measure growth and instability within the sector. This section compiles and presents all relevant research studies related to the overall value chain in agro-processing.

Eskola (2005), in the study, **"Agricultural marketing and supply chain management in Tanzania: A case study",** reveals that 40% of raw cashew nuts transported for processing in Indian factories are procured from Tanzania. The study outlines the cashew supply chain, starting with farmers who sell their produce to primary cashew cooperatives. These cooperatives collect raw cashews from their members, pay a district council levy, and work with agents representing exporters to finalize prices and place orders. The agents then transport the cashews to exporters, who ship them overseas. This process highlights the limited and stagnant state of cashew processing activities within Tanzania during this period.

Hausmann et al. (2007) conducted a joint study titled **"What You Export Matters,"** which emphasizes two priorities for African countries to achieve higher returns: enhancing the variety and technological sophistication of domestically produced goods and increasing exports while diversifying export markets. They find that countries producing and exporting more sophisticated products tend to experience faster economic growth.

Hammed et al. (2008) inquired on **"Cashew Nuts and Production Development in Nigeria."**. They stated that the cashew industry development in the study area calls for improving local processing capacity and discouraging the raw nuts exports from moving towards cashew value addition, thus exploring and acting on the vast market potential.

Lawal et al. (2011) examined the **"Profitability of Value Addition to Cashew Farming Households in Nigeria"**. They found that value-added activities such as grading, heating, roasting, packaging cashew nuts, and processing cashew apples into juice boost revenue, demonstrating a positive correlation between value addition and profitability.

Banerjee and Shrivastava (2014) inquired about the **"Economic Analysis of Cashew Nut Processing in India."** They discovered that when processing 100 kilograms of cashew nuts daily, a daily profit of ₹ 1,329 can be regularly generated, given that the unit is operating at total efficiency and capacity.

Verma et al. (2014) conducted a **"Comparative Economics of Cashew Nut Kernel Processing Technology in Bastar Region of India."** Their study revealed that traditional cashew processing had higher variable costs (Rs. 5.80 lakhs) compared to improved machinery (Rs. 5.43 lakhs). The cost-benefit ratio in traditional and improved technology was 0.169 and 1.57, respectively, while the production cost was 288.56 and 202.80 rupees.

Mundra et al. (2017) examined the **"Value chain analysis of cashew processing."** from inbound logistics reliant on raw cashew imports to processing and packing for outbound logistics. They found that processing raw cashews and cashew apples was significant, producing valuable end products like cashew kernels and CNSL. Their study shows that proper utilization of raw materials increased earnings for farmers, processors, and exporters.

Acchukatla and Srinivasan (2018) conducted **"An Economic Analysis of Cashew Value Chain in the Cuddalore District of Tamil Nadu,"** noting the significant influence of farmers, processors, wholesalers, retailers, local traders, and exporters on industry competitiveness. They suggested that adequate funding and investment in new processing technologies, as well as proper training for small-scale processors, could enhance the value of cashew exports to foreign markets.

Nayak and Paled (2018) studied the **"Trends in Area, Production, Yield, and Export-Import of Cashew in India - An Economic Analysis."** Their study shows that in 2006-07, India exported 6,139 tonnes of cashew nutshell liquid (CNSL) worth Rs. 10.29 crores, with exports peaking in 2011-12 and fluctuating after that. By 2016-17, CNSL exports reached 11,422 tonnes, valued at Rs. 44 crores, which were driven by growing processing capacity in the country.

Buragohain & Borah (2022), in their study **"Growth and Instability in Production of Selected Major Spices and their Export Scenario for India: A Review,'** show that the ginger export quantity had an extremely high instability index recorded at 33.36, while it was lowest for chilli, at 3.98. The export of chilli increases with increased productivity. Throughout the period examined, the export value of chilli was the highest among all the crops.

Studies associated with the constraints in the processing industries

Numerous studies have examined the challenges the agro-processing industries face, with some focusing specifically on the factors that influence their growth and performance. These investigations cover a broad spectrum of issues, from operational inefficiencies and supply chain disruptions to market access and regulatory hurdles. Additionally, research has explored the impact of technological advancements, financial constraints, and policy interventions on the industry's development. All these studies are reviewed in this section.

Kipene (2014) worked on the **"Growth of Small Agro-Processing Firms (SAPF) and their influence on employment creation."** The study findings revealed that a weak marketing structure, high energy costs, low technology, limited access to capital, low managerial skills, and poor policies for business development were all significant issues facing small agro-industries.

Wangwe et al. (2014) examined **"The performance of the manufacturing sector in Tanzania. Challenges and the way forward."** and revealed that Tanzania's value-addition activities are hindered by unsolved administrative, financial, technological, policy, and market challenges that prevent an elevated industrial transformation and growth. Furthermore, the industry relies more on imported raw materials and intermediate goods, implying a poor, backward, and forward linkage essential for creating employment and encouraging local manufacturing.

Kipene et al. (2015) jointly analyzed the **"Growth of Small Agro-Processing Firms in Mbeya and Morogoro."** Their study showed that the processing firms had experienced low growth and could not operate throughout the year and at their optimum capacity due to high raw material costs, the age of the units, and low labour productivity.

ESRF (2015) completed a report on **" Agro-Processing Trade; The Private Sector's Experience of Climate Change along the Value Chain in Tanzania."** The report indicated that agro-processing activities are very low in Tanzania, which is linked strongly to poor rural infrastructure growth, leading to raw agricultural product export and causing the agro-processing sector to struggle to match or satisfy the domestic demand.

Augustino (2017) undertook research titled **"Small Agro-Processing Industries and Rural Household Livelihoods in Tanzania: The Case of Ginger Factory in Same District."** The small-scale factories were unable to process ginger efficiently due to insufficient working capital, unstable market, subpar machinery and low processing technology, inadequate expertise, and lack of approval from the Tanzania Bureau of Standards.

Swai (2017) analyzed the "**Factors Affecting Growth Of Small And Medium Agro-Processing Firms in Tanzania: A Case of Sunflower Oil Processor in Dodoma."** Their study results showed the main constraints to SMEs' growth and performance: the availability of financial resources, technology for processing, and government policy and regulations.

Other significant factors that influenced the growth of the firms were market access, lack of certification, supply of raw materials, and managerial problems.

Srinivasan and Mehazabeen (2018) conducted **"A constraint analysis on small-scale cashew nut industries in Tamilnadu."** They found significant constraints like low quality, seasonal raw nuts, labour shortages, high competition, and lack of market information affect the small-scale cashew nut industries in Tamil Nadu.

Nkwabi et al. (2019) conducted "A review of the challenges affecting the agro-processing sector in Tanzania." The main challenges in Tanzania's agro-processing sector were financial restraints, technological difficulties, market access issues, lack of raw materials, and bureaucracy. Other noted challenges were poor facilities, supply chain issues, and increased costs.

Ojo (2020) surveyed the **"Economics of Cashew Nut Processing in Ondo State, Nigeria; Evidence from Jof Ideal Family Farms Limited."** His study found the constraints facing the company. Some of them include challenges in branding and packaging, poor quality of raw materials, a huge demand-supply gap, and high labour costs that delay the payment of workers' salaries.

Ensermu Gudeta & Tulu (2022) examined **"The role of market linkage in the growth of micro and small scale enterprises: the case of Ambo town, Ethiopia".** Their research work found that MSE growth is influenced by factors such as government support, financial capacity, marketing information access, and entrepreneurial competency.

Endris & Kassegn (2023) conducted an **"Analysis of growth and constraints of agricultural micro- and small-scale enterprises in North Wollo Zone, Amhara Regional State, Ethiopia,"** and identified rising input costs, unreliable input supply, inadequate loans, insufficient working capital, and lack of consistent government support as major challenges of agricultural MSEs in the study area.

This review helps identify the nature of the research conducted by previous scholars and uncover research gaps. A detailed review of the literature is given in chapter two.

THEORETICAL AND CONCEPTUAL FRAMEWORK

A theoretical framework is fundamental in providing a structured approach to examining and understanding the key factors that influence performance within industries. For the cashew processing sector, which operates in a complex environment of supply chains, competitive markets, and regulatory standards, applying well-established theories from economics, management, and industry-specific perspectives can illuminate critical drivers of success and areas for improvement. The theories are discussed as follows.

The Resource-Based View (RBV) is a strategic management theory focusing on how business firms gain competitive advantage based on their resources and capabilities. For cashew processing industries, RBV can help explore the role of resources like raw materials, technology, skilled labour, and efficient processing techniques in enhancing performance. Penrose (1959) laid the groundwork for RBV by exploring how a firm's unique resources drive growth. She argued that growth depends on a firm's ability to manage its resources and leverage firm-specific knowledge and experience, which create competitive advantages that are hard for others to replicate.

The Theory of Constraints (TOC) is a strategic approach in management for recognizing and resolving bottlenecks that impede production efficiency. TOC operates through five steps: identifying the constraint, maximizing its efficiency, aligning other processes to support it, elevating the constraint if needed, and repeating the process for continuous improvement (Goldratt & Cox, 1984; Dettmer, 1997). In cashew processing, TOC helps address constraints in areas like labour, machinery, processing time, and market access, all of which can hinder output and profitability. By focusing on the most critical bottlenecks and optimizing around them, TOC enables cashew processors to improve productivity, streamline workflows, and enhance overall performance, making it a valuable strategy for industries with complex, interdependent processes.

Applying supply chain management principles to cashew processing can enhance efficiency and resilience across sourcing, processing, and distribution. Aligning supply chain strategy with business goals, such as placing processing facilities near farms, reduces costs and improves material flow. Effective demand forecasting and inventory management help prevent bottlenecks and reduce spoilage while mitigating disruptions from demand fluctuations through consistent ordering. Strong supplier relationships, especially with small-scale farmers, ensure quality and reliability, while integrated communication with suppliers and distributors boosts

responsiveness. Risk management practices like supplier diversification and inventory buffers enhance resilience, and regular performance tracking supports continuous improvement. These strategies create a cashew supply chain that efficiently adapts to market demands and external challenges (Lambert & Cooper, 2000; Chopra & Meindl, 2001).

Institutional theory can help to explain how external pressures, such as regulatory, environmental, and socio-cultural factors, influence the performance of cashew processing (Scott, 1995). Coercive pressures push companies to meet food safety, labour, and environmental regulations, while mimetic pressures drive them to emulate successful practices, such as adopting sustainable certifications. Normative pressures reinforce ethical and quality standards industry-wide, fostering consistent labour and environmental practices (DiMaggio & Powell, 2000). Together, these forces shape cashew processors' operations, influencing their approaches to compliance, sustainability, and overall legitimacy within the market.

Total Quality Management is a systematic and comprehensive approach designed to improve and maintain quality throughout every process. In cashew processing, TQM can help focus on achieving high standards in product quality, efficiency, and customer satisfaction. (Deming, 1986) emphasized embedding quality at every stage—from sourcing to packaging—to reduce defects and ensure consistency. (Juran, 1988) advocated for setting clear quality goals and using structured quality control to minimize waste. Adopting TQM helps cashew processors streamline operations and build a strong reputation for quality and reliability.

International Trade Theory explores why countries trade and how comparative advantage, resource endowments, and global demand patterns influence trade flows (Krugman & Obstfeld, 2003). In this study, particularly in the context of cashew exports, this theory can explain Tanzania's role in the global cashew market, considering comparative advantages such as climate and agricultural land that make Tanzania a significant exporter of raw cashews. Additionally, trade theories can help assess how tariffs, trade agreements, and economic partnerships affect export volumes and trade dynamics.

For an empirical basis in forecasting exports, time series models, including Exponential Smoothing, AutoRegressive Integrated Moving Average (ARIMA), or machine learning models, can provide predictive insights based on historical data (Box et al., 2008). These models can help anticipate export trends for raw and processed cashew kernels, allowing the research to explore future trade patterns under different economic scenarios. These models

analyze patterns and seasonality in historical export data to make informed predictions about future export volumes.

Value Chain Theory explores all the processes involved in transforming a product from an idea to a final consumer. (Kaplinsky & Morris, 2000). Applying this theory to cashew exports can provide insights into how Tanzania's cashew sector integrates into global markets, especially how raw and processed cashews move along the value chain and where value is added. This theory can also highlight opportunities for Tanzania to increase its export earnings by moving up the value chain from raw to processed cashew exports.

Using a mix of these theories can provide a holistic framework to analyze various aspects of performance in cashew processing industries, from operational efficiency to market dynamics and sustainability.

CONCEPTUAL FRAMEWORK

The framework for understanding the factors influencing the growth of cashew processing firms in Tanzania includes several interconnected variables and elements. This study considers the firm's growth as the outcome variable. The predictor variables include financial capability, government support, market accessibility, management and labour and technological capacity.

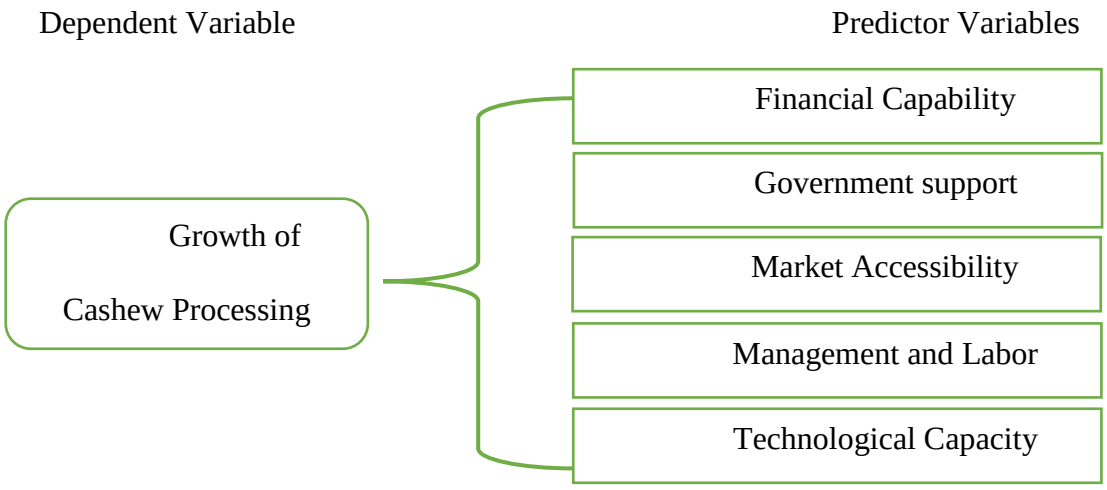

Figure 1.1: Conceptual framework of the suggested model

RESEARCH GAP

The reviewed studies encompass various aspects of cashew production, including its prospects, export marketing, challenges faced by cashew workers, global demand and supply, and the import of raw cashew nuts to align with a country's processing capacity. Additionally, some studies address the technological advancements and mechanization needs of agro-processing factories, as well as the overall value chain of agro-processing

With the increase in Tanzania cashew production, there have been limited studies on the cashew processing industries' performance in Tanzania to investigate the factors influencing the growth of cashew processing industries, associated costs and returns, and instability and growth of kernel exports. This study aims to fill the research gaps in cashew processing industries at the national level.

STATEMENT OF RESEARCH PROBLEM

Industrialization has a significant role in developing a nation like Tanzania, where agriculture is the people's primary occupation. The cashew industry's economic significance and agro-processing lie in the countless labour employed and the sum of foreign currency received by the cashew export. The cashew sector can potentially offer numerous jobs for young people and women. If a higher proportion of the produced raw cashew nuts is domestically processed, there would be an increase in household income, employment, and foreign exchange from cashew exports.

The essence of value addition has received high recognition in the cashew industry. African countries, traders, and exporters such as the Ivory Coast want to head in a different direction, raising their stakes in the shelled cashew market rather than exporting the raw product. Other exporters are focusing on the market of processed and packed nuts led by packers in consumer countries. Nevertheless, these trade forms are deep-rooted, and altering them requires a strong vision of the competitive features that construct the industry, accompanied by diligence and determination. The increase in domestic production, a favourable harvest period, and the best cashew research program in Tanzania should drive Tanzania to build a processing-based cashew industry. Given the huge investment and processing costs of machinery, together with high interest rates in contrast to the cashew export tax, an inquiry arises whether it will be profitable to relinquish the raw cashew exports to the Indian and Vietnam markets in favour of local processing.

From this perspective, industrialization in Tanzania calls for more cashew processing industries and activities using locally available raw cashews. Value addition through processing in the cashew industry is inadequate in Tanzania. While cashew significantly earns millions in foreign exchange for Tanzania, the lack of plentiful domestic processors could mean fewer jobs generated from this treasured commodity. Cashew production is on the rise, but the inability to transform the Tanzania cashew industry's structure is the major block to developing its cashew industry. Even though Tanzania is one of the vital nut producers, its share in the retail cashew market is fringe. It is mislaying a substantial portion of foreign income due to its failure to develop the value-addition processes.

The imbalance between cashew production and the current cashew processing capacity requires studying Tanzania's cashew processing industries' performance. The study was driven by several key research questions: What are the factors influencing the growth of processing units? What is the cost structure of these units? What changes have occurred in raw cashew nut (RCN) production and exports, as well as kernel exports, over the years? What are the future trends in kernel export sales?

OBJECTIVES OF THE RESEARCH

The study's primary purpose is to assess the performance of cashew processing industries in the United Republic of Tanzania. The following objectives are developed for that purpose.

1. To identify and analyse the determinant factors affecting the growth of cashew processing industries in the study area.
2. To evaluate the growth and present trend of development of cashew processing industries in Tanzania.
3. To assess cashew processing industries’ performance in Tanzania regarding cashew nut processing industries’ costs, returns, and profitability.
4. To forecast the future possibilities for expansion and growth of the cashew processing industry in Tanzania.
5. To identify broad policies to improve their industries’ functionality and performance to enhance their contribution to rural-led economic development.

HYPOTHESIS

This study has the following hypotheses.

1. H1: There is a positive significant relationship between financial capability and the growth of cashew processing industries.
2. H2: There is a positive significant association between government support and the growth of cashew processing industries.
3. H3: Market accessibility is positively associated with the growth of cashew processing industries.
4. H4: There is a direct relationship between management and labour skills and the growth of cashew processing industries.
5. H5: There is a positive significant association between technological capacity and the growth of cashew processing industries.

RESEARCH METHODOLOGY

Research methodology is the systematic investigation of how scientific research is conducted. This study's methodology covered the research design, the study area and population, sampling techniques, data sources and collection methods, variable measurement and data analysis and presentation.

Population and sampling techniques

This study focused on the managers and owners of cashew processing industries in the southern and coastal regions of Tanzania, specifically Lindi, Mtwara, Pwani, and Ruvuma, which are significant for cashew production and processing. A total of 1203 respondents from around 250 operational units in these districts were considered, from which a sample of 300 participants was selected. The sample size was determined using Taro Yamane's formula as adopted by (Mgonja & Shausi, 2022).

$$n = \frac{N}{1 - N(e)^2}$$

Where n = the sample size, N = Total number of respondents and *e* (acceptance sampling error) = 0.05.

Therefore, $n = \frac{1203}{1+1203\ (0.05)^2} = 300.19 \approx 300$

Sources of Data

The study utilized both primary and secondary data. Primary data was collected through fieldwork surveys conducted using structured questionnaires featuring closed-ended questions. These questionnaires were distributed to respondents along with a cover letter explaining the study's objectives and sought feedback on several areas such as their years of experience, motivating factors for engaging in cashew processing, costs and returns, challenges faced in cashew processing, and assistance required from the government.

In collecting primary data, managers and owners were used for this study due to their in-depth knowledge of both the operational and strategic facets of cashew processing industries. Their direct responsibilities in financial planning, securing funding, managing cash flow, and implementing technological advancements allow them to provide insights into the financial and technology-driven challenges shaping industry growth. Additionally, their perspectives on market accessibility and the complexities of regulatory frameworks offer a detailed understanding of external factors that impact industry performance, including barriers to market entry and export strategies. This strategic insight is critical for evaluating the factors that foster or inhibit the industry’s expansion.

Beyond strategic and financial insight, managers and owners are also directly involved in managing labour practices and overseeing workforce efficiency. They are well-equipped to address labour-related challenges, such as skills shortages, absenteeism and productivity issues, and to share management practices that enhance overall operational efficiency. Their close interaction with government policies further positions them to evaluate how regulatory support, such as subsidies or constraints, affect industry growth potential. As stewards of both quantitative performance metrics and qualitative insights, managers and owners provide a uniquely balanced perspective that captures the full scope of industry dynamics, making them invaluable sources for this study.

Secondary data was gathered from sources such as the Cashewnut Board of Tanzania (CBT), the Bank of Tanzania (BOT), Food and Agriculture Organization Statistics (FAOSTAT Database), previous research, textbooks, journals, research projects, seminars, and relevant databases.

The study analyzed Tanzania's production and export data of raw cashew nuts and kernels using secondary data from the FAOSTAT database, covering the period from 2001 to 2020.

Additionally, it utilized kernel export data from 1965 to 2023 to forecast export quantities for the next ten years.

Measurement of variables

In examining the factors influencing the growth of cashew processing industries, it is essential to consider the diverse and interconnected factors that affect their growth, such as finance, government support, market accessibility, management and labour, and technology. These factors are quantifiable and profoundly influenced by subjective experiences, perceptions, and context-specific challenges that quantitative measures alone cannot capture.

A qualitative approach was adopted to explore these factors because it allows for a deeper understanding of the how and why behind the challenges and opportunities the cashew processing industries face. While quantitative data might show correlations or trends, qualitative research enables us to explore the context-specific nuances, perceptions, and experiences of those directly involved in the cashew processing industry through business owners and managers. By capturing rich, descriptive insights, we can more effectively grasp the practical implications of these factors on growth and how they shape strategic decision-making within the industry.

Moreover, qualitative data collected from the respondents offers alternative performance indicators, providing an indirect view of financial health and competitiveness through experiences with resource allocation, labour productivity, and market challenges. Respondents' insights highlight practical obstacles, like access to finance, limitations in government support, and technology adoption barriers, which influence growth potential and industry efficiency. By focusing on these qualitative aspects, the study presents a more comprehensive view of industry challenges and opportunities, capturing the lived experiences and contextual intricacies that impact the growth trajectory of cashew processing in Tanzania.

This study consists of six latent variables that analyse the conceptual model. Five variables are exogenous: financial capability (FC), government support (GS), market accessibility (MA), management and labour (ML), technological capacity (TC), and one endogenous variable is the growth of cashew processing industries (GR).

The study used six items to measure growth with an example item for this construct, "The firm can transform from small to medium or medium to large," six items to measure

financial capability (e.g., “The firm struggles with inadequate working capital”), three items to measure government support (e.g., “inadequate subsidies and incentives”), four items to measure market accessibility (e.g., “The firm lacks essential market information for kernels”), three items to measure management and labour, (e.g., “The firm lacks sufficient professional managers”), and three items to measure technological capacity (e.g., “The firm lacks appropriate processing machinery”).

Furthermore, the study measured other variables in different units, such as years, amounts in metric tons and monetary values.

Tools of Analysis

The major statistical tools used to analyze the data in this study are Structural Equation Modelling and Time series analysis.

Structural Equation Modelling (SEM)

Structural equation modelling is a multivariate, hypothesis-driven technique that is based on a structural model representing a hypothesis about the causal relations among several variables. This study used the Partial Least Squares Structural Equation Modeling (PLS-SEM).

This study developed a structural model which considers the growth of cashew processing industries as the dependent variable, while the predictive variables include financial capability, government support, market accessibility, management and labour, and technological capacity.

PLS-SEM is relevant in this study as it facilitates the evaluation of both the measurement model (reliability and validity of constructs) and the structural model (relationships between constructs), thus understanding the strength and significance of each independent variable's effect on Growth.

Time series analysis

Time series analysis involves searching for trends, patterns, and other data features to understand their underlying behaviour, forecast future values, and extract meaningful information from the data set. In this study, Time series data was analyzed to examine the growth, instability and forecasts.

To forecast future kernel sales exports, this study applied ARIMA forecasting, a time series analysis technique that models the relationship between a time series and its lagged values,

differences, and moving averages. It consists of three main components: Autoregressive (AR) terms, Integrated (I) (differencing), and Moving Average (MA) terms. ARIMA models are capable of capturing complex patterns and seasonal variations in time series data, thus making it valuable for forecasting future kernel export values.

In this study, the stability of RCN production and exports, as well as kernel exports, is assessed by adopting the Cuddy-Della Valle index (CDVI), a reliable indicator of instability which measures the variability in data points over time while incorporating both short-term fluctuations and long-term trends.

Growth rates were analyzed using the semi-log function, which was important for this study as it helped to transform data into a linear form, facilitating the interpretation and comparison of growth rates over time. Thus, it simplifies the analysis of exponential growth patterns and enhances the statistical reliability of growth rate estimates.

Furthermore, the study employed descriptive statistics to summarize and describe the participants' responses using frequency distributions.

Ethical considerations

The research adhered to ethical guidelines to ensure participant well-being, rights, anonymity, confidentiality, and study integrity. Participants were fully briefed on the study's objectives, and their consent was obtained before distributing the questionnaire. Privacy rights were upheld, identities were kept confidential, and generic terms like "respondents" and "participants" were used. Participants were free to choose whether to participate.

Scope and Limitations

This study examines the performance of cashew processing industries in Tanzania, providing an in-depth analysis of these industries within four specific regions: Lindi, Mtwara, Pwani, and Ruvuma. The study aims to understand the dynamics, challenges, and opportunities faced by the cashew processing sector in these regions, offering insights particularly relevant to local stakeholders and policymakers.

This study is region-specific, focusing exclusively on the cashew processing industries in four regions of Tanzania: Lindi, Mtwara, Pwani, and Ruvuma. As a result, the findings may not be universally applicable to other regions or countries. Additionally, the study relies on

secondary data, which may have inherent limitations in terms of accuracy, completeness, and timeliness. The specificity of the geographical focus and potential data constraints highlight the need for caution when generalizing the results beyond the studied areas.

CHAPTER SCHEME

The final research report has been organized into six chapters analyzing various issues and major findings, as follows.

Chapter I: Introduction. This chapter deals with the background and context of the study, statement of the research problem, research objectives, significance of the study, research hypotheses, limitations and structure of the thesis.

Chapter II: Review of Literature. It provides an overview of the agro-processing industries, the historical context of cashew production and exports, previous studies on cost structure and returns in agro-processing, factors influencing the growth of processing industries and the overall cashew value chain.

Chapter III. Research Methodology. The chapter covers the research design and approach, data collection methods, sampling techniques, analytical tools and techniques, and study limitations.

Chapter IV: Cashew Processing in Tanzania. It provides an overview of the industry, its historical context, current status, and prospects, highlighting the economic, regulatory, and market dynamics that shape its development.

Chapter V: Performance of the Cashew Processing Industry in Tanzania. This chapter consists of descriptive statistics and summarised data through tables, graphs, and other statistical measures. A structural equation modelling analysis measures the relationship between observed and latent variables. The chapter also analyses the trends in raw cashew nuts production and exports and kernel exports, identifying patterns and changes over time using time-series analysis. Furthermore, it provides details on the cost and the returns from the main and by-products of cashews, thus evaluating the profitability of cashew processing.

Chapter VI: Summary of Findings, Suggestions and Conclusion. It summarises the key findings, implications for policy and practice, and recommendations for stakeholders and suggests areas for further research.

MAJOR FINDINGS

The study on the performance of cashew processing industries in Tanzania revealed significant insights into the sector's dynamics. The findings are presented in several key areas: characteristics of respondents and industries, forecasting kernel exports, instability and growth in cashew kernel exports, and the cost and returns associated with producing kernels and the factors affecting the processing industries.

General Findings

- Most participants (70%) have 6-10 years of experience, suggesting a workforce rich in practical knowledge. (26.33%) of the respondents had up to five years of experience, and only (3.67%) had over ten years of experience in cashew processing.
- Most respondents were agriculturalists (70.3%) before starting or managing the cashew processing industries. Other respondents were traders (25.7%) and industrialists (4%) before engaging in the cashew processing business. Very few respondents had agro-processing knowledge or expertise before engaging in cashew processing.
- Most respondents (55%) lacked related training before joining the industry, indicating a significant skills gap that could affect efficiency and performance.
- The availability of raw materials and the demand for cashew kernels, both domestically and globally, play a crucial role in motivating the respondents to engage in this industry, as agreed by over 82.7% of participants. At the same time, government and financial support were less influential.
- Over 85% of respondents have identified inadequate capital and insufficient incentives and subsidies from the government as the major challenges affecting cashew processing Startups in Tanzania.
- Most industries do not have formal training facilities (78%) for new workers; new workers rely on observation and learning from experienced workers (on-the-job training) rather than formal training facilities.
- Most participants need wide-ranging assistance from the government. This includes capital facilities, technological guidance, the establishment of a dedicated agency for product marketing, training programs to ensure quality standards are met, and the assurance of a consistent supply of raw materials.

- The factors influencing the cashew processing industries were identified as financial capability, government support, market accessibility, management and labour, and technological capacity.

Structural Equation Modelling Assessment

The study used a bootstrapping resampling technique (Efron & Tibshirani, 1994) to assess the significance of paths within the structural model. The hypotheses were tested to determine the significance of associations among latent variables. The findings are as follows:

- A positive significant relationship exists between Financial Capability and Growth, with a p-value of less than 0.05. This indicates that financial capability significantly affects the growth of cashew processing. Therefore, we accept the hypothesis H1, which means that firms with better access to financing have growth potential.
- The findings indicate that Government Support has a positive significantly association with the growth of cashew processing industries ($\beta = 0.170$, $t = 2.411$, $p < 0.05$). Hence, H2 is accepted impliying that a processing industry with government support has high growth potential.
- There is a positive significant association between Market Accessibility and Growth ($\beta = 0.149$, $t = 2.777$, $p < 0.05$), signifying that market accessibility has a significant influence on the growth of cashew processing. Therefore, H3 is confirmed. This means that a processing industry that can easily access raw materials, obtain market information, mitigate risks in price fluctuation, and have the best quality raw cashews can significantly experience growth.
- The relationship between Management and Labour (ML) and Growth is found to be insignificant ($\beta = 0.068$, $t = 0.947$, $p > 0.05$). The findings imply that management and labour have an insignificant impact on the growth of cashew processing. Consequently, H4 is not accepted.
- A significant association exists between technological capacity and Growth ($\beta = 0.262$, $t = 2.62$, and $p < 0.05$), indicating that technological capacity significantly affects the growth of cashew processing. Therefore, H5 is accepted. The results imply that a processing industry can achieve growth if it ensures a reliable power supply, adopts modern technology, and employs skilled technicians to manage repairs as required.

Time Series Forecasting

- The ARIMA (1,1,1) model was identified as the optimal model for forecasting kernel exports in Tanzania. It achieved this with an AIC value of 1073.687 and demonstrated the highest log-likelihood of -533.84 among the models evaluated.
- Over the forecasted years, the annual growth rates of kernel exports in Tanzania are projected to be extremely low, approaching zero. For instance, the prediction for 2033 is approximately 3010.354 tons, indicating an insignificant increase from the preceding forecasted amounts.

Growth and Instability in Raw Cashew Nut Production, Exports, and Kernel Exports

The analysis of Tanzania's raw cashew nuts (RCN) production, exports, and kernel exports yield significant findings regarding trends, growth rates, and instability. Cashews hold immense importance as a cash crop in Tanzania due to their contribution to export earnings.

- The Compound Annual Growth Rate (CAGR) analysis indicates a 6.41% increase in RCN production. From 2001 to 2020, RCN production steadily grew from 122,300 tons to 232,681 tons. Peak production was achieved in 2018, reaching 313,826 tons.
- The production of raw cashew nuts (RCN) had an instability index value of 27.60, indicating that while there is some inconsistency in the production levels of RCN, it is not highly unstable but exhibits a moderate degree of unpredictability.
- RCN exports had a CAGR of 10.4 per cent, whereas the quantity grew from 96,487.00 tons in 2001 to 320,861.98 tons in 2020, with the highest export quantity recorded in 2017 at 329,060.24 tons.
- The export of raw cashew nuts exhibits a high level of variability or fluctuation, with an instability index value of 49.86. This value indicates significant inconsistency and unpredictability in the levels of RCN exports over the measured period.
- The CAGR for Kernel exports was 1.97 per cent, indicating slower growth over time. The quantities exported increased from 816 metric tons in 2001 to 1,495.48 metric tons in 2020.
- The export of cashew kernels shows a very high level of variability, with an instability index value of 67.50. This indicates that the quantity of cashew kernels exported

experiences significant fluctuations and is highly unpredictable over the measured period.

The Costs and Returns in the Cashew Processing Units

Processing cost is a crucial factor in determining the success or failure of a processing unit. High processing costs can lead to lower profit margins, whereas lower processing costs can result in higher profits. A thorough cost analysis involves examining raw material costs, various operational expenses, and the returns generated from processed cashews.

- It was observed that the primary costs in the total expenditure are attributed to the purchase of raw nuts and wages. The total returns from cashew processing amount to approximately $6,557.39 per ton. Over 95% of this revenue ($6,521.74) was generated from the main product. Additional income is derived from by-products.
- The overall operation was found to be profitable, yielding a net return of $707.83 per ton and a cost-benefit ratio of 1.12. This indicates a positive return on investment, making cashew processing in the study area a financially viable activity.

IMPLICATIONS OF THE RESULTS

Cashew processing industries play a crucial role in rural development by generating employment, boosting economic growth, and improving living standards. Leading cashew processing countries increase their income by supplying cashews both domestically and internationally, capitalizing on their advanced technology. These countries enhance value through comprehensive inputs, production, processing, marketing, and trade efforts. Additionally, they import significant quantities of raw cashew nuts (RCN) from top producers to meet and maximize their processing capacities. To fully realize the benefits of cashew processing for rural development, targeted policies must be implemented.

The findings of this research have significant policy implications, urging policymakers to consider these factors in their policy formulations.

1. Collaboration between the government and financial institutions is crucial for the cashew processing industry, providing low-interest, long-term development funds and access to advanced technology and market opportunities.

2. Investing in infrastructure and vocational training in cashew-producing districts is essential to increase the skilled workforce in process optimization, quality control, lean manufacturing, and safety regulations.
3. Introducing cashew kernels to the Tanzania Mercantile Exchange (TMX) will create a reliable, transparent marketplace for processors and exporters, reducing risks. This initiative must consider market dynamics, regulations, quality control, logistics, and stakeholder engagement.
4. Tax exemptions for importing cashew processing machinery would lower costs and make advanced equipment more affordable. This would enhance productivity, efficiency, quality, and capacity, fostering industry growth, boosting competitiveness, and contributing to the sector's economic development.
5. More resources should be invested in the Rural Electrification Agency's (REA) efforts to expand electricity access in unconnected areas while prioritizing gas and other reliable energy sources for consistent power generation.
6. Collaborating with processing experts from highly industrialized countries can bring valuable insights and advanced techniques to the cashew processing industry.
7. Regular assessments and training are essential to ensure compliance with international standards, food safety, and quality control, boosting the competitiveness of Tanzanian cashew kernels in foreign markets.

DIRECTION FOR FUTURE RESEARCH

This study focuses only on identifying and analyzing the factors influencing the cashew processing industries, kernel export forecasts, stability and growth of RCN production and exports, as well as kernel exports and the processing industries' cost structure. However, several factors, such as kernel prices, international market demand, and supply chain logistics, that would influence cashew processing were not analyzed in this research. Therefore, further research is necessary within the context of Tanzania's agro-processing industry.

1. Extension of the study to other raw cash crops, such as sesame and sunflower processing
2. A thorough investment analysis on Cashewnut processing.
3. A financial time series analysis of kernel prices and export values in Tanzania.

4. Impact of governmental policies on the cashew industry.
5. Market diversification and development strategies.
6. Assessment of technological advancements in cashew processing.
7. Supply chain analysis and optimization.
8. Socio-economic impact of agro-processing industries.

CONCLUSION

Cashew processing industries can play a significant role in rural development by generating employment, boosting economic growth, and improving the standard of living of people in rural areas. India and Vietnam achieve more income by supplying cashew kernels not only domestically but also internationally. The achievement is sustained primarily through their capabilities to have higher access to advanced technology than other raw nut-producing countries. These countries have made several efforts from the inputs, production, processing, marketing, and trade to add value to the raw cashew nuts (RCN). They also import substantial RCN from other top-producing countries to meet their processing capacities.

From 2001 to 2020, Tanzania experienced remarkable growth in the production and exports of raw cashew nuts, while the exports of kernels fell behind. However, raw cashew nut and kernel exports encountered high levels of instability. Despite being a major raw nut producer, Tanzania's share in the retail cashew market remains minimal, resulting in a loss of potential foreign income. The lack of value-addition processes hinders the development of the cashew industry and limits job creation opportunities.

To address these challenges, Tanzania must capitalize on the country's abundant supply of raw cashew nuts, significantly improve product quality, invest in market research and intelligence, and promote value addition. Diversifying export markets, primarily through the processing and marketing of cashew kernels, is essential. By optimizing the cashew value chain and emphasizing value addition, Tanzania can unlock the untapped potential of its cashew industry, leading to increased foreign exchange earnings, job creation, and economic growth.

References:

Acchukatla, M., & Srinivasan, G. (2018). *An Economic Analysis of Cashew Value Chain in Cuddalore District of Tamil Nadu*. *6*(1), 4.

Akyoo, A., & Mpenda, Z. (2014). Policy Imperatives For Control of Market Exchange Failure in the Cashew nut Industry. *Natural Resources, Agricultural Development and Food Security: International Research Network*, *14*(3), 1–38.

Augustino, I. K. (2017). *Small Agro-Processing Industries and Rural Household Livelihoods in Tanzania: The Case of Ginger Factory in Same District* [Masters Thesis]. Mzumbe University.

Banerjee, S., & Shrivastava, S. L. (2014). Economic analysis of cashew nut processing in India. *Economic Affairs*, *59*(3), 429–437.

Box, G. E. P. (with Jenkins, G. M., & Reinsel, G. C.). (2008). *Time series analysis: Forecasting and Control.* (4th ed). J. Wiley & Sons.

Buragohain, A., & Borah, S. (2022). Growth and Instability in Production of Selected Major Spices and their Export Scenario for India: A Review. *Bhartiya Krishi Anusandhan Patrika*, *1*(5). https://doi.org/10.18805/BKAP541

Cashewnut Board of Tanzania. (2017). *Cashewnut Processing Programme*. Cashewnut Board of Tanzania (CBT), Mtwara, Tanzania.

Cashewnut Board of Tanzania. (2019). *Raw cashew nut production trend (2004/2005—2017/2018)*. Cashewnut Board of Tanzania (CBT), Mtwara, Tanzania.

Cashewnut Board of Tanzania. (2021). *Performance of Raw Cashewnuts Exports From 1990/1991 to 2020/2021*. Cashewnut Board of Tanzania (CBT), Mtwara, Tanzania.

Cashewnut Board of Tanzania. (2022). *Cashewnut Processing Industries*. Cashewnut Board of Tanzania (CBT), Mtwara, Tanzania.

Chopra, S., & Meindl, P. (2001). *Supply Chain Management: Strategy, Planning, and Operation.* Prentice-Hall, Upper Saddle River, NJ.

Deming, W. E. (1986). *Out of the Crisis.* MIT Center for Advanced Engineering Study. https://mitpress.mit.edu/9780262541152/out-of-the-crisis/

Dettmer, W. H. (1997). *Goldratt's Theory of Constraints A Systems Approach to Continuous Improvement.* ASQ Quality Press.

DiMaggio, P. J., & Powell, W. W. (2000). *The iron cage revisited institutional isomorphism and collective rationality in organizational fields* (Economics Meets Sociology in Strategic Management (Advances in Strategic Management); Vol. 17, pp. 143–166). Emerald Group Publishing Limited. https://doi.org/10.1016/S0742-3322(00)17011-1

Efron, B., & Tibshirani, R. J. (1994). *An Introduction to the Bootstrap*. Chapman and Hall/CRC. https://doi.org/10.1201/9780429246593

Endris, E., & Kassegn, A. (2023). Analysis of growth and constraints of agricultural micro- and small-scale enterprises in North Wollo Zone, Amhara Regional State, Ethiopia. *Cogent Social Sciences*, *9*(1). https://doi.org/10.1080/23311886.2023.2197291

Ensermu Gudeta, O., & Tulu, D. T. (2022). The role of market linkage in growth of micro and small scale enterprises: The case of Ambo town, Ethiopia. *Journal of Innovation and Entrepreneurship*, *11*(1), 64. https://doi.org/10.1186/s13731-022-00258-9

Eskola, E. (2005). *Agricultural marketing and supply chain management in Tanzania: A Case Study* (Working Paper Series No. 16). ESRF Study on Globalisation and East Africa Economies. http://hdl.handle.net/20.500.12018/3039

ESRF. (2015). *Agro-Processing Trade; The Private Sector's Experience of Climate Change along the Value Chain in Tanzania*. Economic and Social Research Foundation.

Goldratt, E. M., & Cox, J. (1984). *The goal: A process of ongoing improvement.* North River Press.

Hammed, L. A., Anikwe, J. C., & Adedeji, A. R. (2008). Cashew Nuts and Production Development in Nigeria. *American-Eurasian Journal of Scientific Research*, *3*(1), 54–61.

Hausmann, R., Hwang, J., & Rodrick, D. (2007). What You Export Matters. *Journal of Economic Growth*, *12*(1), 1–25.

Juran, J. M. (1988). *Juran's Quality Control Handbook*. McGraw-Hill.

Kaplinsky, R., & Morris, M. (2000). *A Handbook for Value Chain Research.: Vol. 113.* Brighton: University of Sussex, Institute of Development Studies.

Kipene, V. (2014). *Growth of Small Agro-Processing Firms (SAPF) and their influence on employment creation* [PhD Thhesis]. Sokoine University of Agriculture.

Kipene, V., Lazaro, E., & Isinika, A. C. (2015). Growth of Small Agro-Processing Firms in Mbeya and Morogoro, Tanzania. *International Journal of Research*, *2*(10), 33–38.

Krugman, P. R., & Obstfeld, M. (2003). *International Economics: Theory and Policy.* (6th International Edition). Addison Wesley, Massachusetts.

Lambert, D. M., & Cooper, M. C. (2000). Issues in supply chain management. *Industrial Marketing Management*, *29*(1), 65–83.

Lawal, J. O., Oduwole, O. O., Shittu, T. R., & Muyiwa, A. A. (2011). Profitability of value addition to cashew farming households in Nigeria. *African Crop Science Journal*, *19*(1).

Mgonja, N. S., & Shausi, G. L. (2022). Challenges Facing Small-scale Cashew Nut Processors in Ruangwa district, Tanzania: An Implication for Policy Change: An implication for policy change. *European Journal of Agriculture and Food Sciences*, *4*(3), 1–8. https://doi.org/10.24018/ejfood.2022.4.3.492

Mundra, M., Manikandan, S., Gadhe, S., & Ajmal, A. (2017). Value chain analysis of cashew processing. *Bulletin of Environment, Pharmacology and Life Sciences*, *6*(Special-2), 482–485. https://doi.org/10.15740/HAS/AU/12.TECHSEAR (3)2017/688-691

Nayak, M., & Paled, M. (2018). Trends in Area, Production, Yield and Export-Import of Cashew in India- An Economic Analysis. *International Journal of Current Microbiology and Applied Sciences*, *7*(12), 1088–1098. https://doi.org/10.20546/ijcmas.2018.712.135

Nkwabi, J., Mboya, L., Nkwabi, J., & Nkwabi, J. (2019). A Review Of The Challenges Affecting The Agroprocessing Sector In Tanzania. *Asian Journal Of Sustainable Business Research*, *1*(2), 68–77.

Ojo, I. O. (2020). Economics of Cashew Nut Processing in Ondo State, Nigeria; Evidence from Jof Ideal Family Farms Limited. *ZBW-Leibniz Information Centre for Economics*. http://hdl.handle.net/10419/222258

Penrose, E. (1959). *The Theory of the Growth of the Firm.* (Fourth Edition). Oxford University Press.

Rabany, C., Rullier, N., & Ricau, P. (2015). *The African Cashew Sector in (2015): General Trends and Country Profiles. Analysis of Cashew Production, Processing and Trade in Africa.* African Cashew initiative (ACi) & RONGEAD.

Scott, W. R. (1995). Institutions and organizations SAGE publications. *Inc USA.*

Srinivasan, G., & Mehazabeen, A. (2018). A constraint analysis on small scale cashew nut industries in Tamilnadu. *International Journal of Information Research and Review*, *5*(7), 5625–5627.

Swai, M. I. (2017). *Factors Affecting Growth Of Small And Medium Agro-Processing Firms In Tanzania: A Case Of Sunflower Oil Processor In Dodoma* [Master Thesis]. University of Dodoma.

Tanzania National Bureau of Statistics. (2020). *Tanzania in Figures 2019* (p. 125). National Bureau of Statistics, Ministry of Finance and Planning. Dodoma, Tanzania. https://www.nbs.go.tz/index.php/en/tanzania-in-figures

Tanzania National Bureau of Statistics. (2022). *Tanzania in figures 2022* (p. 177). National Bureau of Statistics, Ministry of Finance and Planning. Dodoma, Tanzania. https://www.nbs.go.tz/index.php/en/tanzania-in-figures

Verma, P. K., Nag, S., & Patil, S. (2014). Comparative economics of cashew nut kernel processing technology in Bastar region of India. *Bangladesh Journal of Agricultural Research*, *39*(1), 165–172. https://doi.org/10.3329/bjar.v39i1.20166

Wangwe, S., Mmari, D., Aikaeli, J., Rutatina, N., Mboghoina, T., & Kinyondo, A. (2014). *The performance of the manufacturing sector in Tanzania. Challenges and the way forward.* WIDER Working Paper, Helsinki. http://www.wider.unu.edu/publications/working-papers/2014/en_GB/wp2014-085/

PUBLICATIONS

1. Examining the dynamics of cashew kernel exports in Tanzania: A time series forecasting approach, *Journal of Management* (JOM), 11(2), 2024, pp. 1-8.

ON PROGRESS

1. "Understanding The Dynamics of Tanzania's Raw Cashew Nuts Sector: Production, Export Fluctuations, and Kernel Exports", submitted to Orissa Journal Of Commerce

2. "Examining the factors influencing the growth of cashew processing firms in Tanzania using Smart PLS-SEM", submitted to the Indian Journal of Global Economics and Business.

CONFERENCES PRESENTED

1. 'Examining the Factors Affecting the Growth of Cashew Processing Firms in Tanzania' in the International Conference on Contemporary Researches in Engineering, Science, Management & Arts (ICCRESMA) created & powered by the Centre for Research and Training (CRT), National Foundation for Entrepreneurship Development (NFED), Coimbatore, Tamil Nadu, India on 22 - 24 February 2024.

2. 'Forecasting Cashew Kernel Exports in Tanzania' in the International Conference on Recent Advances in Science, Engineering, Technology and Management (ICRASETM-2024), held on 22nd - 23rd March 2024.